5. SUMMARY OF SITE CHARACTERISTICS

5.1 Physiography, Geology, and Hydrology

The INEEL is located on the northeastern portion of the Eastern Snake River Plain (ESRP), a volcanic plateau that is primarily composed of silicic and basaltic volcanic rocks with interspersed sedimentary material. In this region, the climate is characterized as semidesert with hot summers and cold winters. Normal annual precipitation is 22.1 cm (8.71 in.). Within the ESRP, the INEEL is located in a topographically closed drainage basin. Natural sources of surface recharge in the basin include Birch Creek, the Little Lost River, and the Big Lost River. The Big Lost River channel is typically dry because of the arid climate, high infiltration rates through the alluvium, and active upstream irrigation and flood control diversions. Other natural sources of surface water include occasional heavy precipitation or snowmelt, which results in surface water runoff into natural drainage areas, usually in January through April of each year. The surface water serves as a recharge source to the underlying SRPA, which occurs at depths of 61 to 154 m (200 to 500 ft) bls. In the SRPA, regional groundwater flow is to the southwest at average estimated velocities of 1.5 m/day (5 ft/day), with significant local deviation due to local hydraulic influences and variability in saturated thickness and the characteristics of the basalts and sedimentary interbeds. The northern portion of the INTEC lies within the Big Lost River 100-year floodplain (Figure 5-1). The SRPA was designated a sole-source aquifer under the Safe Drinking Water Act on October 7, 1991 (55 FR 50634).

The INEEL contains valuable historic, cultural, and biological resources. To protect these resources, surveys will be performed prior to implementing field work to ensure that no cultural artifacts, threatened or endangered species will be impacted by any remedial action.

5.1.1 Conceptual Model of Water Sources and Hydrogeology at WAG 3

The INTEC is located in the south-central portion of the INEEL. Average elevation at INTEC is 1,498 m (4,917 ft). The facility's northwest corner is approximately 46 m (150 ft) southeast of the Big Lost River channel, which flows along the northwest border of the INTEC facility boundary. As with much of the Big Lost River on the INEEL, the channel is typically dry at INTEC, however, the Big Lost River flowed during most of 1997 and 1998. At land surface, as much as 18.2 m (60 ft) of surficial alluvium is composed of gravelly, medium-to-coarse-grained sediment. This alluviual material overlies a series of basalt/sediment units where the basalt is very transmissive, and the sediment units are relatively thin, much less transmissive, and laterally discontinuous. Below a depth of roughly 137 m (450 ft), the basalts are more massive, with one primary sedimentary interbed (H-I interbed) occuring at a depth of roughly 198 m (650 ft). These deeper units comprise the SRPA under and southwest of the INTEC. Regional groundwater flow in the area of INTEC is affected by local recharge as well as by locally high permeability basalts. The average groundwater flow velocity beneath the INTEC is about 3 m/day (10 ft/day).

As an operating facility, there are several sources of aquifer recharge at INTEC that include natural sources such as precipitation infiltration and intermittent flows of the Big Lost River, as well as anthropogenic water sources including the INTEC percolation ponds, sewage treatment ponds, lawn irrigation, and other miscellaneous sources. As this water infiltrates downward through the alluvium and the underlying transmissive basalts it is impeded by lenses of low permeability sediments and potentially by low permability basalt flows, creating local areas of higher water saturation or moisture content. In some instances, enough water is present in or on top of the sedimentary interbeds to form local perched water bodies. A hydrologic cross-section showing the conceptualization of this water/basalt/sediment system is shown in Figure 5-2. The water shown on this cross-section is based on water level measurements. Therefore, it does not depict saturated sediments or fractured basalt seepage paths beneath surface water features like the percolation ponds and the Big Lost River. In the simplified model used for contaminant transport modeling the sedimentary interbeds were grouped into three or four general units

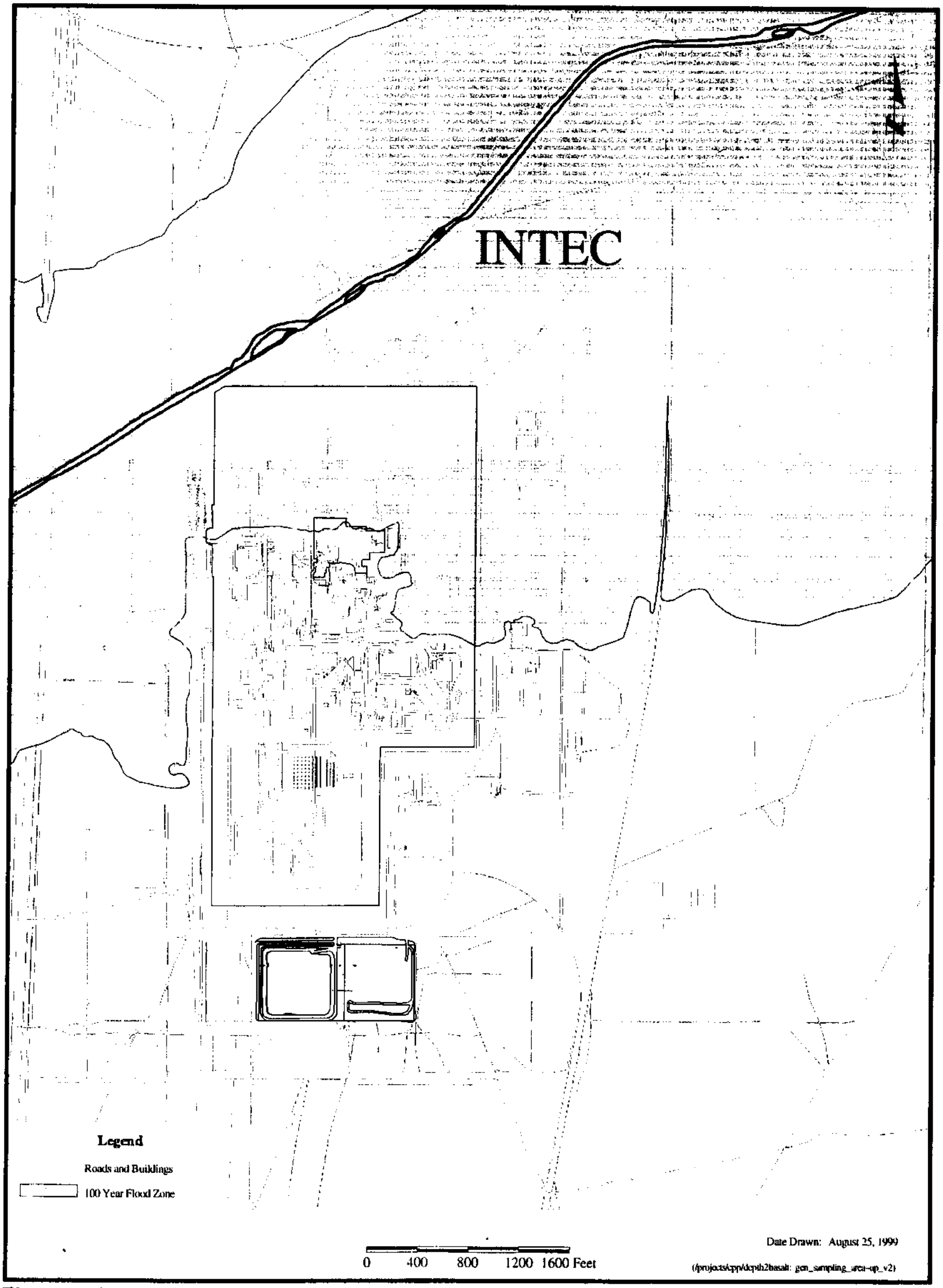
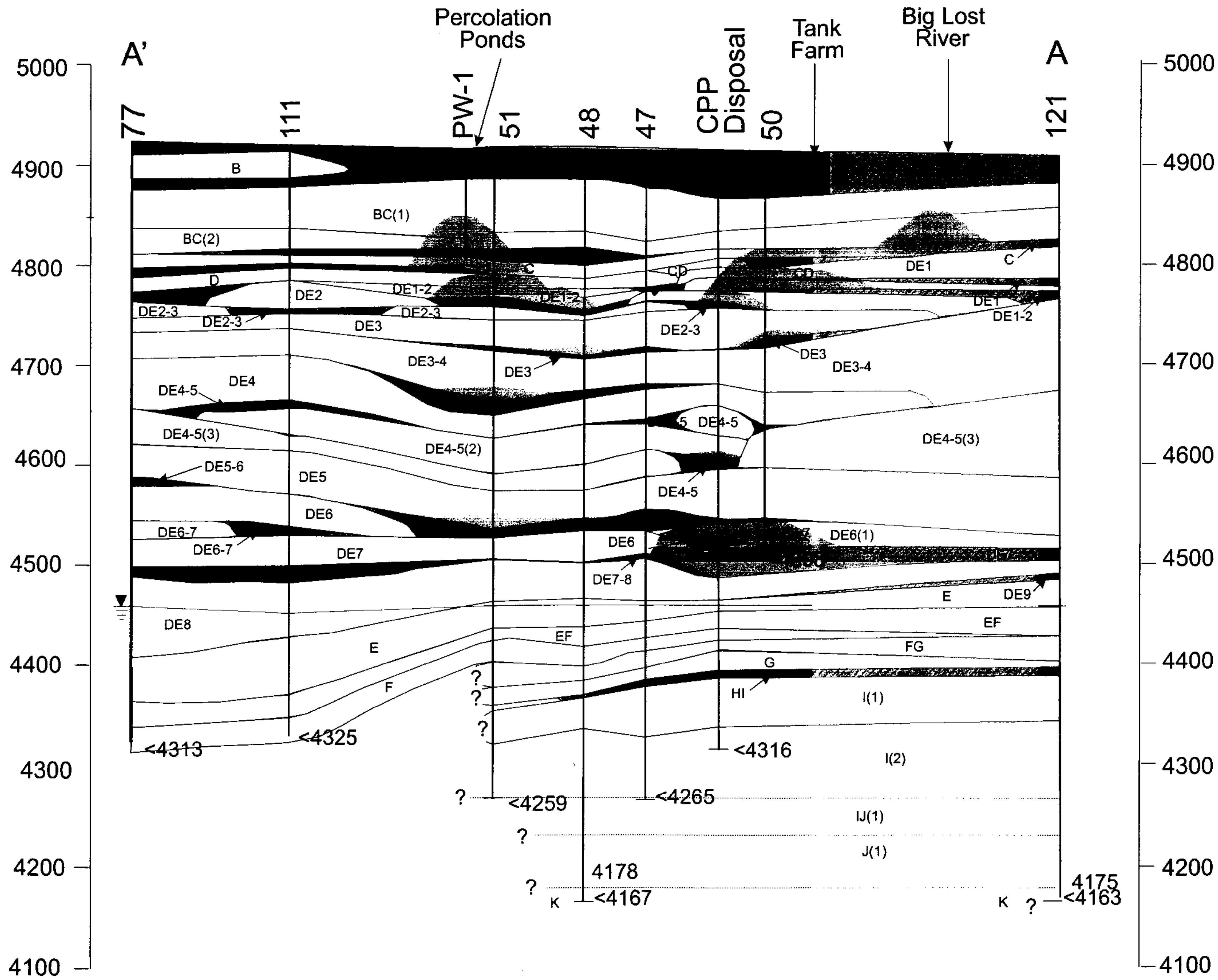


Figure 5-1. 100-year floodplain map at INTEC (USGS 1998).



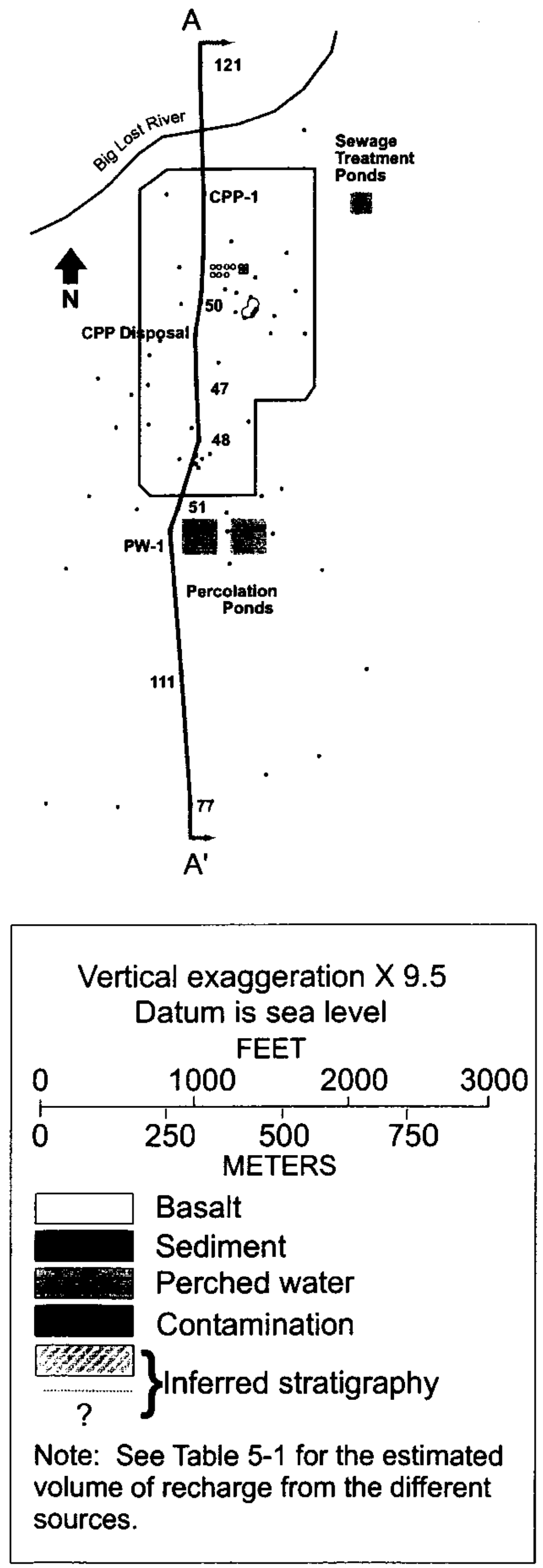


Figure 5-2. Cross section of the vadose zone at the INTEC illustrating the generalized movement of water from the surface to the aquifer, based on Anderson 1991.

based on drilling logs. Each modeled interbed zone consists of multiple noncontiguous sedimentary units that were lumped together to preserve total sediment thickness.

5.1.1.1 Recharge Sources. Perched water bodies are known to exist beneath the INTEC. Perched water bodies are present beneath the percolation ponds and the INTEC plant facilities, including the Tank Farm. The uppermost perched water zone identified at the INTEC occurs within the Big Lost River alluvium above the basalt. The source of water creating these perched water zones include both natural and man-made features. Natural perched water recharge sources at the INTEC include precipitation and the Big Lost River. Man-made perched water recharge sources include the INTEC percolation ponds (service wastewater ponds), water system leaks, sewage treatment ponds, landscape irrigation, unlined surface water drainage ditches, steam condensate, and CPP-603 basins. Table 5-1 provides the estimated volume of water recharging the perched water bodies at INTEC from the various sources. Figure 5-2 illustrates the occurrence of the interbeds beneath the INTEC and the associated perched water zones. The largest perched water body in the southern INTEC results from percolation pond infiltration.

The percolation ponds and the Big Lost River are the primary sources of recharge to perched water, comprising about 91% of the total recharge at the INTEC. The percolation ponds contribute about 70% of the total perched water recharge. Percolation Ponds 1 and 2 are located outside the INTEC southern security fence, southeast of CPP-603. The percolation ponds are unlined wastewater disposal ponds that were excavated in the surficial alluvium in 1982 and 1985. The Big Lost River contributes about 21% of the total perched water recharge.

5.2 Conceptual Model of Contaminant Distribution and Transport at WAG 3

Figure 5-3 is a conceptual drawing showing the main contaminant sources and transport mechanisms at WAG 3. Water infiltrating from the surface transports contaminants between contaminated surface soils and the SRPA. Contaminants present in the recharge water and perched water in the upper portion of the vadose zone are primarily Sr-90 and tritium. Contamination in the lower portion of the vadose zone is different in composition and concentration than the upper zone. The lower vadose zone perched water was influenced and partially contaminated as a result of two events during which the INTEC injection well (CPP-23) collapsed and service wastewater was released into the vadose zone above the lower sediment units. Additional contamination in the lower perched water zone is the

Table 5-1. Estimated volume of water recharging the perched water bodies at INTEC.

Source	Volume (gal/yr)	Volume Percent
Service wastewater (percolation ponds)	690,000,000	70.4
Sewage treatment ponds	14,974,228	1.5
Water system leaks[a]	3,973,202	0.4
Landscape irrigation[a]	1,299,470	0.1
Precipitation infiltration	64,957,269	6.6
Steam condensate	1,668,327	0.2
CPP-603 Basins	49,275	< 0.1
Big Lost River	202,564,301	20.7
Total	979,486,072	100

a. Estimate based on past leaks and irrigation practices. Actual loss from piping leaks is not known.

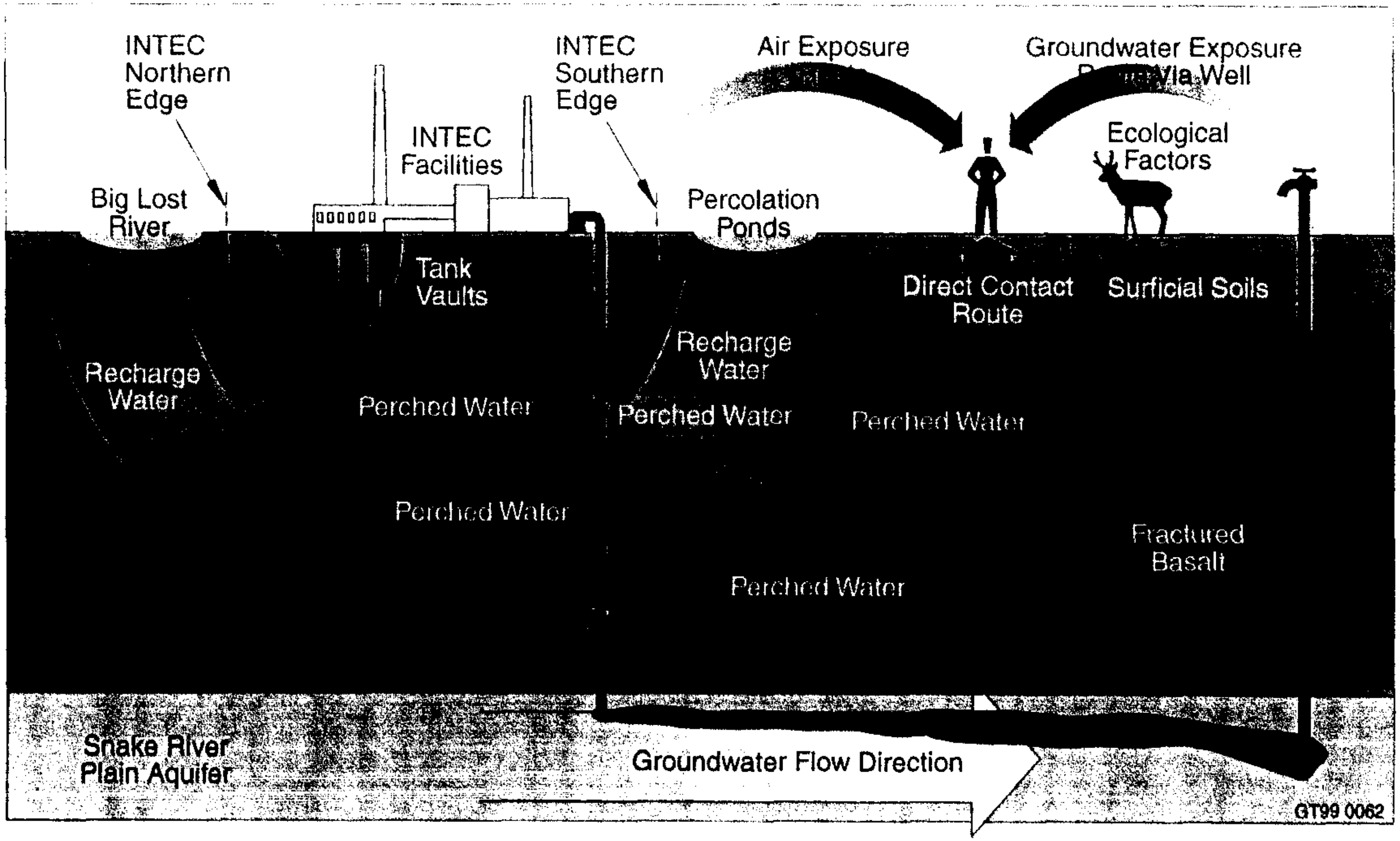


Figure 5-3. INTEC site conceptual model.

result of the transport of contaminants from the alluvial soils and upper perched water contamination. The lower vadose zone contamination includes Cs-137, Sr-90, plutonium, I-129 and mercury. Although contaminants are locally present in perched water, they are generally not available for consumption because of limited availability of that water. There are no water supply wells in the perched zone. Wells installed in the perched zone would not be capable of sustaining the pumping rates needed for future domestic water supplies. Furthermore, following this ROD's perched water remedies, the elimination and absence of man-made recharge will greatly reduce the primary recharge sources of perched water. As such, the perched water does not pose a direct human health threat, but impacts aquifer groundwater quality because it is a contaminant transport pathway between the contaminated surface soils and the SRPA.

The SRPA has been contaminated by historical INTEC operational waste disposal activities. Release site CPP-23 (OU 3-02) consists of the former INTEC injection well, which was the primary means of disposing of service wastewater from 1952 to 1984 and is the primary source of contamination in the SRPA at INTEC. In 1984, the well was removed from routine service and wastewater was subsequently discharged to the percolation ponds. After 1984, the well was used for emergency purposes in 1986, and was permanently sealed in 1989.

Radionuclides that were introduced into the aquifer from the former injection well include Pu-238, Pu-239, Pu-240, Sr-90, I-129, and tritium. Of these, tritium was the most common, comprising about 96% of the contaminant activity. At the time of injection, the radionuclides were generally below federally regulated levels. The injected wastewater also contained other (nonradioactive) chemicals including arsenic, chromium, mercury, and nitrates at concentrations below federal and state groundwater quality standards. Mercury, however, is estimated to exceed groundwater quality standards in the immediate vicinity of the former injection well but has not been detected in downgradient wells.

Subsequent migration of these contaminants has produced several overlapping groundwater contaminant plumes, containing tritium, Sr-90, and I-129 currently occurring in groundwater beneath INTEC and extending downgradient for several miles (Figures 5-4, 5-5, and 1-7). Short-lived (<30 year half-life) radionuclides, such as tritium, do not pose a long-term risk. Strontium is predicted to persist in the aquifer beyond 2095 at levels above the MCL if no action is taken. I-129 has a very long half-life and is predicted to persist in the aquifer at concentrations exceeding MCLs.

Leaching and transport of Tank Farm soil contaminants poses an additional future risk to the aquifer from Sr-90 and other contaminants (see Section 7). An evaluation of these risks and possible remedial actions for the Tank Farm soils is the focus of the OU 3-14 RI/FS.

The human health and environmental threat posed by the contaminated aquifer is groundwater ingestion. Based on the groundwater simulations presented in the RI/FS, the contaminant plume is not expected to migrate beyond the INEEL boundary at concentrations exceeding MCLs The plume does not present a threat to off-INEEL drinking water users. The remedial action objectives will assure that the aquifer meets MCLs within the INEEL boundary by 2095. As the plume gets further from INTEC, it becomes more dilute, and by the time it reaches the INEEL boundary the MCLs are no longer exceeded.

The aquifer beneath the INTEC fenceline will be evaluated in OU 3-14. The focus of OU 3-14 will address aquifer contaminants from the injection well (CPP-23) and the Tank Farm. Other sources of aquifer contamination inside the INTEC fence will also be investigated as part of OU 3-14, as necessary.

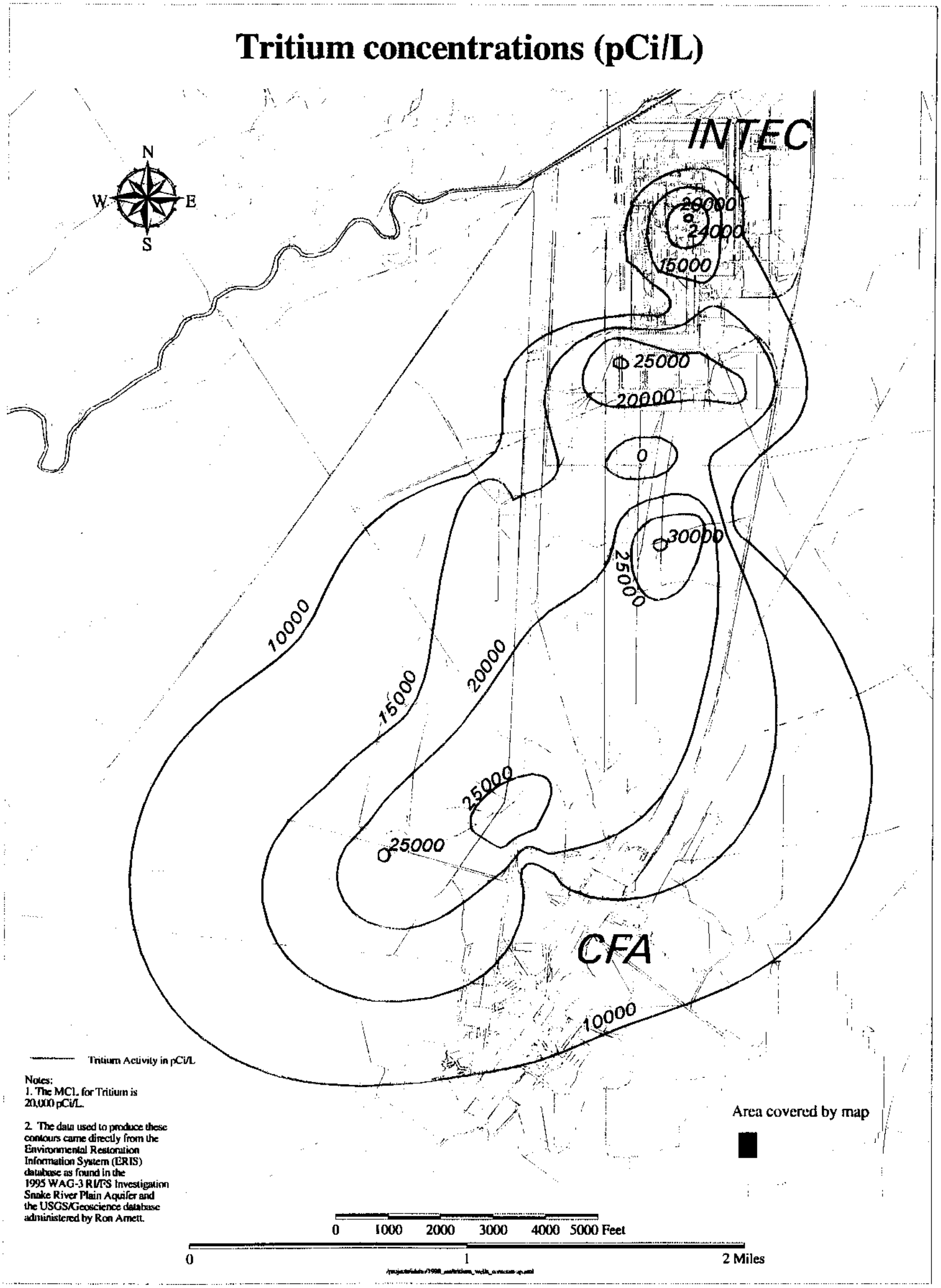


Figure 5-4. SRPA tritium plume (1995 data).

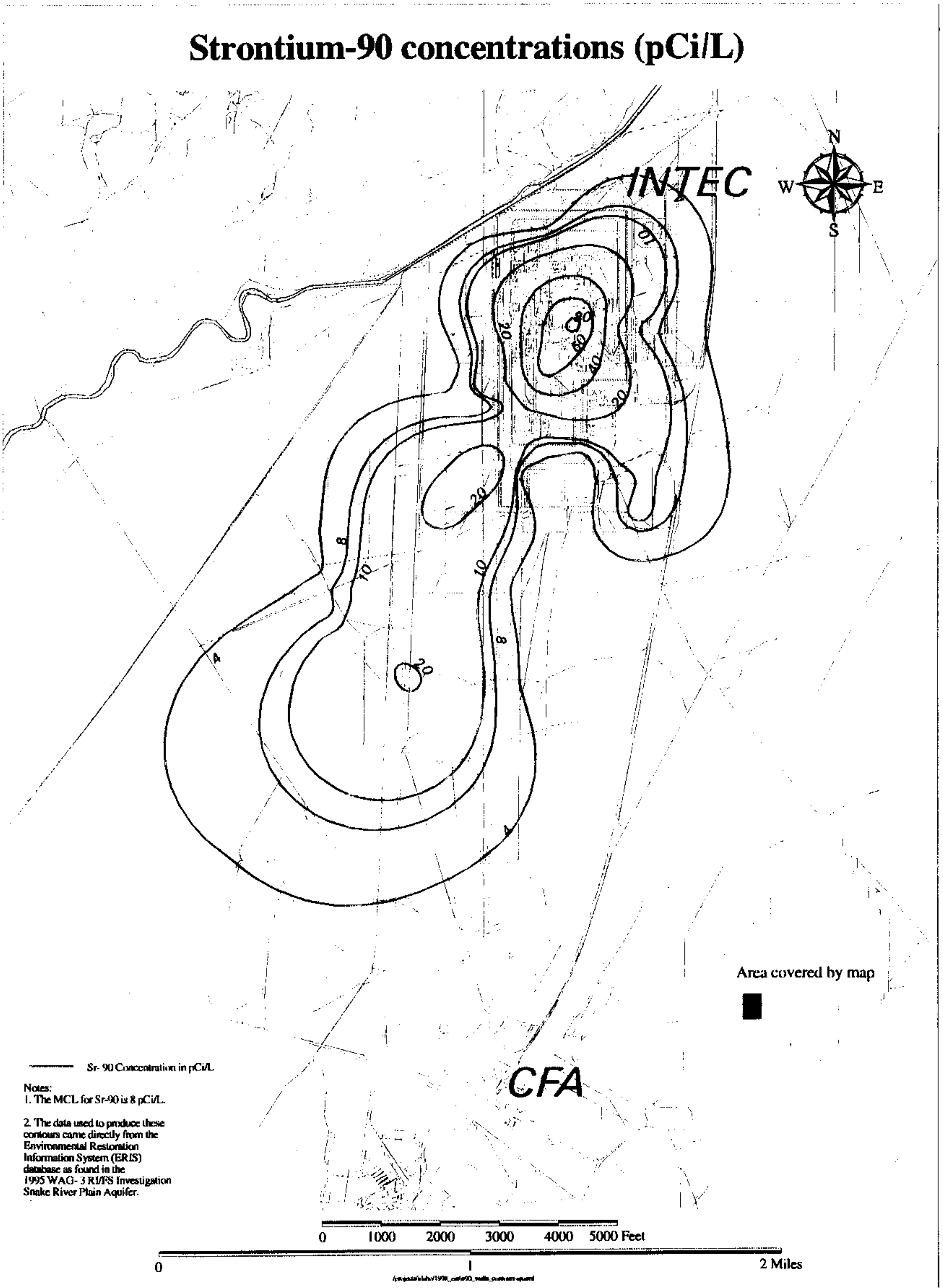


Figure 5-5. SRPA Sr-90 plume (1995 data).

5.3 Nature and Extent of Contamination

The nature and extent of contamination at the WAG 3 release sites determined to present an unacceptable risk or threat to human health or the environment are described below, by site group. These sites have actual or threatened releases of hazardous substances, which, if not addressed by implementing the response actions selected in this ROD, may present imminent and/or substantial endangerment to public health, welfare, and/or the environment. The detected contaminants of potential concern for each group or site are summarized.

5.3.1 Tank Farm Soils (Group 1)

Based on the results of drilling and sampling at previously identified release sites, the horizontal extent of contamination is generally localized at the site of the spill or leak, but, in some cases, contamination has been found to extend vertically to the soil/basalt interface at approximately 14 m (45 ft) bgs. Contamination has also been found along gravel lenses within the Tank Farm. Some spills and releases were cleaned up and excavated soils were replaced with contaminated backfill. Contaminants released to the soils are suspected to have migrated into the underlying basalt and the SRPA. Because current information regarding the nature and extent of Tank Farm contamination is inadequate to support selection of a final remedy, a separate RI/FS for the Tank Farm is underway. The OU 3-14 RI/FS will further investigate contamination at the Tank Farm and develop alternatives for a final remedy. An interim action for the Tank Farm soils is presented in this ROD. Soil contamination at the Tank Farm is summarized in Table 5-2 except data from sites CPP-16, CPP-24, and CPP-30 which are classified as "No Action" sites. All the Tank Farm sites are shown in Figure 1-3. The Tank Farm soils are considered principal threat wastes.

The major radionuclide contaminants in the Tank Farm soils are Am-241, Sr-90, Cs-137, Eu-154, Pu-238, Pu-239/240, Pu-241, and U-235. Nonradionuclide contaminants include mercury and nitrate.

Tank Farm sites with wastes derived from spills associated with the INTEC liquid waste treatment system will be assigned four EPA listed waste codes (F001, F002, F005, and U134). The wastes will also be evaluated to determine if they exhibit hazardous characteristics. The results of the investigations performed to date indicate that the principal threats posed by the Tank Farm Soils sites are from external exposure to surface and near-surface radionuclides and from future ingestion risks from leaching and transport of radionuclides to the SRPA. In addition, nonradionuclide constituents may be present in Tank Farm soils; the presence of such contamination will be addressed in the OU 3-14 RI/FS. Known releases to the Tank Farm include a number of separate documented release sources as follows:

5.3.1.1 CPP-15. The solvent burner at Site CPP-15 began operation in the late 1950s and was dismantled in 1983. Before the solvent burner, a stack preheater was located at this site. Waste solvent, primarily kerosene and tributyl phosphate degradation products contaminated with low levels of radionuclides, were held in the tank and piped to the solvent burner for disposal. Demolition of the solvent burner occurred in late 1983 including removal of the furnace/burner unit, furnace duct, control shed, piping, valves and controls within the shed, and piping penetrating the shed. In addition, an unknown amount of contaminated soil was removed along with the solvent tank. In September 1995, LMITCO construction personnel encountered elevated radiological readings while conducting an excavation in the western half of the site. Six soil samples were collected in the area of the contaminated footing. Based on this sampling, contaminants of potential concern (COPCs) identified for this site include thallium, zirconium, Am-241, Cs-137, Eu-154, Np-237, Pu-238, Pu-239/240, Tc-99, and U-235.

Table 5-2. Summary sampling results statistics for Tank Farm (Group 1) soil contaminants.[a]

Contaminants	Soil Concentration (mg/kg [nonradionuclide] or pCi/g [radionuclide]) Minimum	Maximum	Arithmetic Mean	Standard Deviation	RME[b]	Number of Samples	Number of Detects	Frequency of Detection	INEEL Background[c] (mg/kg or pCi/g)	Number of Samples Greater than Background
Ag	2.80E-01 B	1.15E+00 J	6.54E-01	1.78E-01	1.01E+00	50	35	70%	0.00E+00	35
As	2.80E+00 J	6.80E+00 J	4.25E+00	9.25E-01	6.10E+00	50	47	94%	5.80E+00	3
Ba	4.45E+01	1.93E+02 J	9.06E+01	4.39E+01	1.78E+02	50	50	100%	3.00E+02	0
Be	2.43E-02	4.50E-01	2.84E-01	1.49E-01	5.82E-01	16	15	94%	1.80E+00	0
Cd	2.20E-01 B	1.12E+01 J	3.84E+00	3.39E+00	1.06E+01	83	53	64%	2.20E+00	34
Co	1.86E+00	4.40E+00 B	3.33E+00	6.47E-01	4.62E+00	16	16	100%	1.10E+01	0
Cr	1.00E+00 J	1.13E+02 J	2.05E+01	2.07E+01	6.19E+01	58	58	100%	3.30E+01	10
Cu	7.38E+00	1.28E+01	9.92E+00	1.81E+00	1.35E+01	16	16	100%	2.20E+01	0
Hg	2.00E-02 J	4.44E+00	3.03E-01	6.32E-01	1.57E+00	95	59	62%	5.00E-02	53
Pb	4.80E+00	3.17E+01 J	1.17E+01	6.82E+00	2.53E+01	50	50	100%	1.70E+01	10
Mn	9.15E+01	1.18E+05	5.08E+03	2.42E+04	5.35E+04	24	24	100%	4.90E+02	1
Ni	1.34E-01 J	1.94E+01 J	1.35E+01	4.03E+00	2.16E+01	24	24	100%	3.50E+01	0
Se	5.10E-01 J	8.00E-01 B	6.97E-01	1.62E-01	1.02E+00	34	3	9%	2.20E-01	3
Sr	3.61E+03	3.61E+03	3.61E+03	NA	NA	1	1	100%	NA	NA
Th	4.85E+00	4.85E+00	4.85E+00	NA	NA	16	1	6%	4.30E-01	1
V	9.10E+00 B	1.85E+01	1.47E+01	2.77E+00	2.02E+01	17	17	100%	4.50E+01	0
Zn	3.20E+01	5.55E+01	4.18E+01	6.98E+00	5.58E+01	16	16	100%	1.50E+02	0
Zr	5.13E+00	1.40E+01	8.61E+00	3.55E+00	1.57E+01	5	5	100%	NA	NA
Fluoride	5.30E-01	6.72E+00 J	1.70E+00	1.14E+00	3.98E+00	41	40	98%	NA	NA
Nitrate	3.50E-01	8.10E+00	1.68E+00	1.54E+00	4.76E+00	54	51	94%	NA	NA

Table 5-2. (continued).

Contaminants	Soil Concentration (mg/kg [nonradionuclide] or pCi/g [radionuclide]) Minimum	Maximum	Arithmetic Mean	Standard Deviation	RME[b]	Number of Samples	Number of Detects	Frequency of Detection	INEEL Background[c] (mg/kg or pCi/g)	Number of Samples Greater than Background
Methylene Chloride	5.90E-03 JB	9.10E-03 JB	8.08E-03	1.31E-03	1.07E-02	5	5	100%	NA	NA
Toluene	1.00E-03 J	2.00E-03 J	1.14E-03	3.78E-04	1.90E-03	22	7	32%	NA	NA
Trichloroethane	1.00E-03 J	4.60E-03 J	2.80E-03	2.55E-03	7.90E-03	6	2	33%	NA	NA
Am-241	6.00E-02	1.66E+04 J	6.25E+02	3.08E+03	6.79E+03	64	29	45%	1.1E-02	29
Ce-144	1.44E+01	1.44E+01	1.44E+01	NA	NA	12	1	8%	NA	NA
Co-60	9.00E-02	2.27E+04	1.81E+03	6.28E+03	1.44E+04	41	13	32%	NA	NA
Cs-134	1.30E-01	7.55E+04	5.40E+03	2.02E+04	4.58E+04	41	14	34%	NA	NA
Cs-137	4.78E-02	1.02E+08	1.31E+06	1.02E+07	2.17E+07	119	111	93%	8.2E-01	99
Eu-154	1.54E-01 J	5.65E+05	1.65E+04	9.54E+04	2.07E+05	45	35	78%	NA	NA
H-3	2.49E+04	2.49E+04	2.49E+04	NA	NA	1	1	100%	NA	NA
Np-237	1.00E-01 J	1.63E+00	5.12E-01	4.94E-01	1.50E+00	46	14	30%	NA	NA
Pu-238	2.99E-02	2.76E+05	8.25E+03	4.73E+04	1.03E+05	64	34	53%	4.90E-03	34
Pu-239/240	2.58E-02	1.26E+04	1.08E+03	3.35E+03	7.78E+03	70	26	37%	1.00E-01	17
Pu-241	1.05E+06	1.05E+06	1.05E+06	NA	NA	1	1	100%	NA	NA
Pu-242	3.20E+01	3.20E+01	3.20E+01	NA	NA	1	1	100%	NA	NA
Ru-106	6.66E-02	5.41E+01	2.71E+01	3.82E+01	1.04E+02	31	2	6%	NA	NA
Sr-90	1.60E-01	5.68E+07	7.02E+05	5.97E+06	1.26E+07	93	91	98%	4.90E-01	85
Tc-99	9.00E-01	3.67E+01	4.40E+00	1.02E+01	2.48E+01	12	12	100%	NA	NA
U-234	7.00E-02	2.12E+01	9.85E-01	2.75E+00	6.49E+00	63	61	97%	1.44E+00	3
U-235	2.03E-02	9.00E+03	7.70E+02	2.17E+03	5.11E+03	53	19	36%	NA	NA
U-236	7.55E-01	7.55E-01	7.55E-01	NA	NA	1	1	100%	NA	NA

Table 5-2. (continued).

Contaminants	Soil Concentration (mg/kg [nonradionuclide] or pCi/g [radionuclide]) Minimum	Maximum	Arithmetic Mean	Standard Deviation	RME[b]	Number of Samples	Number of Detects	Frequency of Detection	INEEL Background[c] (mg/kg or pCi/g)	Number of Samples Greater than Background
U-238	4.51E-02	1.39E+00	5.42E-01	4.31E-01	1.40E+00	63	58	92%	1.4E+00	0
Gross Alpha	5.20E+00	1.20E+01	7.35E+00	2.19E+00	1.17E+01	11	11	100%	NA	NA
Gross Beta	3.60E+01	6.89E+02	1.62E+02	1.86E+02	5.34E+02	11	11	100%	NA	NA

a. NOTE:

- Duplicate sample results were not included in the statistical analysis.
- Analytical results used in the table are taken from Appendix G of the OU3-13 RI/FS Part A (DOE-ID, 1997b) for Group 1 Sites: CPP-15, -20, -25, -26, -27, -28, -31, -32A, -32B, -33, -58A, -58B and -79.
- Only those constituents that were identified above detection limits are shown in the table except for the following constituents which were detected but are not considered to be present at hazardous concentrations: Al, Ca, Fe, Mg, K, Na and K-40.
- Samples rejected because of an unacceptable quality control parameter are not included in the table.

b. The RME concentration is the 95% upper value based on the empirical rule (95%of the measurements lie within two standard deviations of their mean).

c. The INEEL background concentrations represent the 95% upper confidence limit (Rood et al. 1995).

B = The analyte reported value is <RDL, but >IDL.

J = The analyte was identified in the sample but the numerical result may not be accurate.

NA = Not Applicable.

RME = Reasonable Maximum Exposure.

5.3.1.2 CPP-16. CPP-16 consists of soil contaminated by a single release of low-level radioactive water that was spilled during a transfer between Tank WM-181 and the PEW Feed Tank WL-102. The water transferred between these two tanks typically contained very low-level levels of radioactivity; an estimated 1.2 Curies of Cs-137 was released. The soil at the spill site was reportedly removed as part of the ICPP Radioactive Waste System Project during a valve box replacement. (WINCO 1993a, DOE et al 1994a).

5.3.1.3 CPP-20. Site CPP-20 is the location of the Radioactive Waste Unloading Area north of building CPP-604, which was used before 1978. Waste from INEL facilities were transported to the unloading area at the ICPP where it was unloaded at this location via transfer hoses. The liquids were transferred to an underground storage tank before concentration in the PEW Evaporator. It is known that the liquid contained radioactive contaminants and was required to have a pH of less than 2. It has been reported that occasional spills occurred during the unloading process as a result of leaks in the hoses. The spills were reportedly cleaned up as they occurred.

The entire area was excavated in 1982 and 1983-1984 during Phase 1 and 2 of the Fuel Processing Facility Upgrade Project. During Phase I, the entire area was excavated down to 12.2 m (40 ft). Based upon personnel interviews, the first 3.1 m (10 ft) of soils were backfilled with 5 mR dirt that was then covered with 9.1 m (30 ft) of clean fill. The source of the clean fill is unknown. During Phase II, portions of the area were excavated again. Based on personnel interviews, soils were excavated down to 12.2 m (40 ft) in the eastern sections of sites CPP-20 and CPP-25. Only at the location of valve box C-30 were soils found to be contaminated and subsequently removed. The excavated soils were stockpiled and contaminated soils separated and later placed in trenches in the northeast corner of the ICPP outside of the security fence (Site CPP-34). Materials used to backfill the excavation consisted of 3 mR soil placed in the bottom 3.1 m (10 ft) and clean soils placed in the upper 9.1 m (30 ft). The source of the clean fill material included soils excavated from a sand and gravel pit located at the CFA.

No soil sampling data were collected at the CPP-20 site due to the area being excavated during the Phase 1 and 2 Fuel Processing Facility Upgrade Project. Although there are no records to verify the cleanup of this area, the radiological survey of this area in 1990-1991 did not detect surface radiation levels above background.

Contaminated soils at Site CPP-20 are believed to be confined to soil with gross radiation readings of 3 to 5 mR placed at depths between 9.1 to 12.2 m (30 to 40 ft) during upgrade projects in the 1980s. Soil above a depth of 9.1 m (30 ft) was reportedly clean fill. Because of the lack of confirmatory soil sampling in the area, soil concentrations from previously excavated Tank Farm soil were assumed representative of the soil beneath both sites (CPP-20 and CPP-25). This assumption was made even though the fill soil is believed to be uncontaminated because it was common practice to use backfill containing trace quantities of radioactivity during the 1980s.

5.3.1.4 CPP-24. Site CPP-24 is located in the Tank Farm and consists of an area of approximately 1.7 m^2 (18 ft^2). In 1954, approximately 38 L (1 gal) of radioactively-contaminated solution was spilled from a bucket onto the ground while work was being conducted at Tank WM-180. The logbooks indicate that the spilled material was removed. Although the exact location of this spill is not known, radiation surveys in the area revealed no radiation levels above background (WINCO 1993a, DOE et al 1994a).

5.3.1.5 CPP-25. Site CPP-25 is the location of a ruptured transfer line that released an unknown quantity of liquid waste adjacent to the north side of building CPP-604.

The eastern portion of Site CPP-25 overlaps the area of Site CPP-20. The transfer line that was being used to transfer liquid waste from WC-119 to WL-102, ruptured on August 28, 1960 contaminating the soil adjacent to the building. According to direct radiation readings at the time of the incident, the soil was initially contaminated to levels of $2 \times 10^{+04}$ R/hr. Approximately 7 m^3 (9 yd^3) of contaminated soil was removed and taken to the RWMC for disposal. No records exist to verify the effectiveness of these cleanup activities. However, during 1981 and 1983 the entire site was excavated during Phases I and II of the Fuel Processing Facility Upgrade Project. This excavation included the eastern portion of sites CPP-20 and CPP-25 as discussed above. Fill materials placed back into the excavation consisted of 3 mR material in the bottom of the excavation and clean soils in the upper 9.1 m (30 ft).

Contaminated soils at Site CPP-25 are believed to be confined to soil with gross radiation readings of 3 to 5 mR placed at depths between 9.1 to 12.2 m (30 to 40 ft) during upgrade projects in the 1980's. Soil above a depth of 9.1 m (30 ft) was reportedly clean fill. Because of the lack of confirmatory soil sampling in the area, sample results from previously excavated Tank Farm soil will be assumed, for the purposes of the BRA, to be representative of the soil beneath both sites CPP-20 and CPP-25.

5.3.1.6 CPP-26. CPP-26 consists of soil potentially contaminated by a 1964 release of radioactive steam that was inadvertently released to the air through a faulty hose coupling on the decontamination header. The volume of radioactively-contaminated steam that was released at Site CPP-26 is unknown. The release is assumed to have contaminated the land surface of approximately 13 acres to the northeast of building CPP-635. However, in an approved Track 2 NFA recommendation, the scope of the CERCLA investigation was limited to that portion of the site inside the Tank Farm. The original land surface at the time of the release (prior to membrane installation) is now located at a depth of 0.7 m (2.5 ft) bgs.

5.3.1.7 CPP-27 and CPP-33. Sites CPP-27 and CPP-33 consist of contaminated soil associated with subsurface releases of HLLW from the Tank Farm transfer system near the northeast corner of building CPP-604. These sites were determined to be related to releases from the same source and, therefore, are being addressed as a single release site. Following cleanup, it was estimated that 25 mCi of radioactivity in soil remained in place (WINCO 1993i).

In 1983, additional contaminated soil was discovered. This additional contamination, thought to be the result of a separate release from the same transfer line, was designated CPP-33. Cleanup efforts in 1983 removed approximately 10,710 m^3 (14,000 yd^3) of contaminated soil. Of this total, approximately 1,530 m^3 (2,000 yd^3) exceeding 30 mR/hr of beta-gamma radiation was removed and placed in trenches. The soil in these trenches is addressed separately as Site CPP-34 (Section 18). After the 1983 excavation, the CPP-33 area was backfilled and trace amounts of radioactively contaminated soils were reportedly left in place below, and lateral to the excavated area (WINCO 1993i). It appears that the majority of contamination is located in the southwest portion of the site where levels as high as 30 mR/hr were measured below a depth of 6.1 m (20 ft).

5.3.1.8 CPP-28. The contamination at Site CPP-28 was discovered in 1974 during the installation of a cathodic protection electrode in the Tank Farm area. Soil with radioactive contamination up to 40 R/hr was encountered at a depth of about 1.8 m (6 ft) bgs. The leak was later determined to be from a 0.3 cm (1/8 in.) diameter hole inadvertently drilled through one side of the 7.6-cm (3-in.) diameter stainless steel pipe during original construction in 1953. The HLLW consisting of first-cycle raffinate most likely leaked through secondary containment to the surrounding soil. In late 1974, approximately 45 m^3 (56 yd^3) of contaminated soil having an estimated 3,000 Ci of gross radioactivity was removed from the area above the pipeline leak. No contaminated soil was removed from below the pipe encasement due to high levels of radioactivity in the soil. The excavated area was subsequently backfilled.

5.3.1.9 CPP-30. Site CPP-30 was a 6 × 6 m (20 × 20 ft) area of surface soil contamination near Tank Farm Valve Box B-9. The area was contaminated during a one-time preventative maintenance activity in which residual decontamination solution from the floor of the value boxes contaminated personnel clothing, and equipment. The contaminated soil was removed and disposed at the Radioactive Waste Management Complex (RWMC) (WINCO 1993a, DOE et al 1994a).

5.3.1.10 CPP-31. In November 1972, HLLW was released to the surrounding soil during a transfer between tanks WM-181 and WM-180. The release was caused by a failure of a 8-cm (3-in) diameter carbon steel waste transfer line where it was speculated that the highly acidic HLLW corroded the transfer line. This transfer line is located about 2 ft below grade. Estimated radionuclide concentrations include Cs-137 (at up to 2,190,000 pCi/g), Sr-90 (up to 710,000 pCi/g), Pu-239/Pu-240 (up to 1,500 pCi/g), and U-235 (up to 9,000 pCi/g). Other radionuclides estimated to be present at lesser concentrations are Co-60, Cs-134, and Ru-106.

5.3.1.11 CPP-32. Site CPP-32E is an area of contaminated soil southwest of valve box B-4. This area is approximately 0.7 m^2 (8 ft^2) and about 0.3 m (1 ft) deep with radiological contamination up to 2 R/hr. The contaminated soil appeared to have originated from the stand pipe (air vent tube and view port pipe) that extended out of the valve box. It is likely that the contamination from the stand pipe at this site was the result of condensation of humidity in valve box B-4. CPP-32W is located about 15 m (50 ft) northwest of valve box B-4 and consists of soil contaminated to 2 R/hr covering an area of about 0.6 m^2 (6 ft^2) to a depth of about 0.3 m (1 ft). The contaminated material apparently originated from a 5.1-cm (2-in.) diameter aboveground line. The line was used to pump water from tank sumps to the PEW Evaporator. It is likely that the contaminated area was the result of a leak that occurred from this line during a transfer of water that contained radionuclides.

5.3.1.12 CPP-58. Site CPP-58W consists of soil affected by a release of PEW condensate in 1954. Site CPP-58E consists of soil affected by a leak of PEW condensate in 1976. The results of the gamma analysis detected only Cs-137 and K-40. Contamination is estimated to be present from 2 to 14 m (6 to 46 ft) below grade.

5.3.1.13 CPP-79. CPP-79 was originally defined as soil contaminated by the releases of waste solutions in July and August of 1986 due to an obstruction in a transfer line. A second, deeper zone of contamination at this site is believed to be related to the release of HLLW at Site CPP-28.

The releases occurred when the liquid waste was obstructed in the transfer line and backed up through an open drain line and into valve box A-2. Approximately 9,500 L (2,500 gal) of low-level radioactively contaminated liquid leaked. A second, deeper zone of contamination was discovered during the drilling of boring CPP-79-1 at a depth of 9.1 m (30 ft) bgs. This deeper zone of contamination has much higher concentrations of radionuclides than the shallower zone and appears to be related to the known release of HLLW at Site CPP-28. It is believed that the HLLW released at Site CPP-28 migrated to the south to the deep soil with high radionuclide concentrations encountered in boring 79-1.

5.3.2 Soils Under Buildings or Structures (Group 2)

Because of the inaccessibility of most of these sites, only limited soil characterization data are available. Knowledge of the associated processes and waste streams at these sites and an estimate of the potential leak or spill volume provided the basis for determining the types and quantities of contaminants that may be present at these sites. The soils at Sites CPP-87 and -89 have been sampled and analyzed. The results of the RI/BRA indicate that the primary threats posed by these sites are external exposure to the soils, should they be available for exposure and continued leaching of contaminants to the SRPA. The external exposure threat is currently an incomplete pathway and the leaching is being controlled by the presence of the building, which limits infiltration.

The Soils Under Buildings or Structures group is comprised of release sites in OUs 3-09, 3-12, and 3-13 that occur beneath INTEC buildings or structures, and includes Sites CPP-02, -41A, -60, -68, -80, -85, -86, -87, and -89 (Figure 1-5). These sites consist of soil contamination that resulted from past hazardous or radioactive liquid spills, leaks, and plant operations and are considered low-level threat wastes.

The individual release sites comprising Group 2 include:

5.3.2.1 CPP-02, French Drain West of Building CPP-603: 14,000,000 L (3,698,408 gal) of basin water was disposed per year. An estimated 493 Ci was released with the major isotope being tritium. The Graphite fuel storage building was constructed over this site. The site has not been sampled. If not for the depth of release and the presence of the graphite fuel storage building, this site would pose a threat due to external exposure. Modeling performed during the RI/FS indicated that this site presents a groundwater risk. Currently the leaching of contamination is being controlled by the building limiting infiltration. Should the building be removed this contamination will present a direct exposure risk and increased groundwater risk.

5.3.2.2 CPP-41A. Site CPP-41A is one of two pits where oils and organic materials were placed in metal drip pans and ignited for fire brigade practice. The training pits are no longer in use. CPP-41A is a pit that has been covered with asphalt and, because it is close to building CPP-663, it is suspected of having been excavated and removed during construction of CPP-663.

5.3.2.3 CPP-60. Site CPP-60 is a small cinder block building commonly referred to as a paint shop but was actually used to house hazardous materials. It was suspected that during paintbrush cleaning, solvents were discharged to the surrounding soil. The building was removed in the 1970's and CPP-645, an office building, is now located over the area. No samples were collected to confirm the existence or absence of contamination at this site (WINCO 1992f).

5.3.2.4 CPP-68. Site CPP-68 is the former location of an abandoned 1,892 L (500 gal) underground gasoline storage tank. Use of the tank was discontinued in 1983 and the tank was removed in 1986. During exhumation of the tank, there was no visual evidence to suggest that the tank leaked. There are no operating records prior to 1983 or records of spills associated with the operation of this tank. A single sample of the tank bed soil was analyzed and found to contain only traces of gasoline range organic constituents that did not exceed risk-based levels. In addition, visual examination of the tank bed soil did not suggest tank leakage (WINCO 1993g).

5.3.2.5 CPP-80, Building CPP-601 Vent Tunnel Drain Leak: Soil contamination resulted from leakage of corrosive condensate from a cast iron underground line. No soil sampling was performed due to the inaccessibility of the site. Approximately 397,468 L (105,000 gal) of condensate containing 550 Ci of radionuclides were estimated to have been released to the soil between 1983 and 1989. The leaked contaminants have been observed in the 34 m (110 ft) perched water. Due to the depth of the release and the presence of Building CPP-601 this site only presents risks via the groundwater exposure pathway. Modeling performed during the RI/FS indicated that this site presents a minor groundwater risk. For purposes of groundwater modeling, the inventory for this site was presumed to be equal parts Cs-137 and Sr-90. Currently the leaching of contamination is being controlled by the building limiting infiltration. Should the building be removed, this contamination will present a direct exposure risk and increased groundwater risk. Should the building be removed this contamination would pose an external exposure risk and a minor increased groundwater risk.

5.3.2.6 CPP-85. Site CPP-85 is the WCF blower corridor, which was used to vent gases from the WCF hot cells to the blower pit and subsequent HEPA filtration prior to atmospheric discharge. The WCF blower corridor is a 46 to 60 cm (18 to 24 in.) vitrified clay pipeline surrounded by a poured square concrete envelope. No samples were taken from inside the corridor, but samples collected from the blower pit downstream showed the presence of various fission products including Cs-137 at 49,600 pCI/g. Video inspection of the corridor interior taken in 1994 did not show any evidence of deterioration of the pipeline; therefore, there is no evidence of contamination on, or migration of, contaminants from the CPP-85 blower corridor (DOE-ID 1997b).

5.3.2.7 CPP-86. Site CPP-86 is a waste trench that runs underneath CPP-602, which is a laboratory and office building that also houses a liquid product denitrator. The trench, which lies approximately 3 m (10 ft) bls, collects liquid waste from various CPP-602 operations. The waste is subsequently routed to the PEW evaporator system. During modification of the trench in 1990, mercury was found in a sample of sludge and dirt that originated from the base of the trench (DOE-ID 1997b).

5.3.2.8 CPP-89 and CPP-87, Building CPP-604/605 Tunnel Excavation: This site consists of contaminated soil encountered while excavating an emergency fire exit from the basement area of Building CPP-604/605. The excavation included an area immediately south of CPP-604, as well as beneath the building. Contaminated soil adjacent to two deteriorated carbon steel pipes was excavated as part of the piping removal. The excavated soil was placed in boxes and is currently stored at CERCLA Site CPP-92. No effort was made to remove all of the contaminated soil. Soils remaining in place at CPP-89 have not been sampled. The boxed soil (CPP-92) from CPP-89 was sampled and the results are summarized in Table 5-3. The contaminants identified in these samples are consistent with soil contamination resulting from release of service waste and PEW evaporator condensates that typically include nitric acid, mercury, plutonium, Cs-137, and Sr-90. Modeling performed during the RI/FS indicated this site presents a groundwater risk. Currently the leaching of contamination is being controlled by the building limiting infiltration. Should the building be removed, this contamination will present a direct exposure risk and an increased groundwater risk.

5.3.3 Other Surface Soils (Group 3)

The Other Surface Soils group consists of release sites located in areas near Building CPP-603 (Sites CPP-01, -03, -04, -05, -08, -09, -10, -11, and -19), Building CPP-633 (Sites CPP-36 and -91), the calcined solids storage bins (Sites CPP-13, -35, and -93), disposal trenches (Site CPP-34), the old STP (Site CPP-14), the grease pit (Site CPP-44) near Building CPP-1619, Site CPP-55 near temporary Building TB-1, the percolation ponds (Site CPP-67) situated south of the INTEC fence CPP-37a, gravel pit east of the INTEC fence CPP-37b, an old construction landfill within the fence, and CPP-48, site of the former dump tank. In addition, Site CPP-92 is included in Group 3 and consists of 653 boxes of radionuclide-contaminated soils that were generated as a result of a variety of INTEC activities. Figure 1-6 shows the location of the Group 3 sites. These sites generally consist of soil contamination that resulted from inadvertent spills and leaks of radioactive waste, decontamination solutions, spent fuel storage water, storage of radionuclide-contaminated equipment, and other plant-generated wastewaters. The soils at the Group 3 sites are identified as low-level threat wastes.

Investigations conducted at these sites have determined the extent of soil contamination. Based on the results of drilling and sampling, the contamination generally occurs in the upper few feet of the soils; however, some sites (CPP-36 and CPP-91) have contamination that extends to the surface soil/basalt interface, at a depth of about 12 m (40 ft). The results of the RI/BRA indicate that the primary threat posed by these sites is external exposure to radionuclides.

Table 5-3. Summary sampling results statistics for soil contaminants at Site CPP-89 (excavated soil was placed into boxes that are currently stored in Site CPP-92).[a]

Contaminants	Soil Concentration (mg/kg [nonradionuclide] or pCi/g [radionuclide]) Minimum	Maximum	Mean	Standard Deviation	RME[b]	Number of Samples	Number of Detects	Frequency of Detection	INEEL Background[c] (mg/kg or pCi/g)	Number of amples Greater than Background
As	1.60E+00 B	5.90E+00	4.11E+00	1.25E+00	6.61E+00	15	15	100%	5.80E+00	1
Hg	6.00E-02 B	1.04E+01	1.49E+00	2.90E+00	7.29E+00	17	15	88%	5.00E-02	15
Se	2.10E-01 B	.10E-01 B	3.20E-01	1.00E-01	5.20E-01	16	4	25%	2.20E-01	3
Am-241	2.00E-02	2.36E+01	2.83E+00	6.58E+00	1.60E+01	14	14	100%	1.10E-02	14
Co-60	3.90E+00	3.90E+00	3.90E+00	NA	NA	1	1	100%	NA	NA
Cs-134	2.30E+00	2.30E+00	2.30E+00	NA	NA	1	1	100%	NA	NA
Cs-137	1.40E-01	7.73E+03	1.25E+03	2.70E+03	6.65E+03	14	14	100%	8.20E-01	11
I-129	3.10E+00	3.10E+00	3.10E+00	NA	NA	1	1	100%	NA	NA
Np-237	1.50E-01	1.50E-01	1.50E-01	NA	NA	1	1	100%	NA	NA
Pu-238	2.00E-02	2.59E+02	3.83E+01	8.86E+01	2.16E+02	14	14	100%	4.90E-03	14
Pu-239/240	0.00E+00	2.47E+01	3.30E+00	7.57E+00	1.84E+01	14	14	100%	1E-01	4
Sb-125	1.30E+01	1.30E+01	1.30E+01	NA	NA	1	1	100%	NA	NA
Sr-90	3.00E-01	1.08E+04	1.48E+03	3.02E+03	7.52E+03	14	14	100%	4.90E-01	13
U-234	5.10E+00	5.10E+00	5.10E+00	NA	NA	1	1	100%	1.44E+00	1
U-235	2.30E-01	2.30E-01	2.30E-01	NA	NA	1	1	100%	NA	NA

a. NOTE:

- Duplicate sample results were not included in the statistical analysis.
- Analytical results used in this table are samples collected from boxed soil from the 1991–1992 emergency fire exit excavation at building 604/605 (CPP-89).
- Samples were analyzed for VOCs, inorganics, and radionuclides. Only those constituents identified in Appendix G of the OU 3-13 RI/FS Part A (DOE-ID 1997b) are shown in this table.
- Samples rejected because of an unacceptable quality control parameter are not included in this table.

b. The RME concentration is the 95% upper value based on the empirical rule (95%of the measurements lie within two standard deviations of their mean).

c. The INEEL background concentrations represent the 95% upper confidence limit (Rood et al. 1995).

B = The analyte reported value is <RDL, but >IDL.

J = The analyte was identified in the sample but the numerical result may not be accurate.

NA = Not Applicable.

RME = Reasonable Maximum Exposure.

Because of the generally small area and contaminant mass of most of these sites, the quantities of COCs present at most sites do not pose a threat to groundwater. However, several sites have significant sources at or near the soil basalt interface. For those sites there is a minor threat to groundwater. The COCs at these sites include both radionuclide and nonradionuclide contaminants.

5.3.3.1 CPP-35 (Building 633 Decontamination Spill). Site CPP-35 resulted from a spill of decontamination fluid that entered the WCF air transport system and was released to soil. This release was estimated to have a contaminated area of 111 m^2 (1200 ft^2). The release was approximately 38 L (10 gal) of solution containing nitric acid, mercuric nitrate, heavy metals, fluoride, nitrates, and as much as 10 Ci of total activity. Contaminated soil and gravel were removed and shipped to the RWMC for disposal. Sampling results data from the Track 2 investigation are summarized for CPP-35 in Table 5-4. No contaminants were detected below 2 m (7 ft).

5.3.3.2 CPP-36 (Contaminated Soil Southeast of the INTEC Stack). The contamination at Site CPP-36 is the result of the three separate releases, which are described below:

1. In 1970, the calciner offgas lines between the WCF and the stack were excavated. Highly contaminated soil (up to 20 R/hr) was encountered at a depth of 1.8 m (6 ft) beneath Olive Avenue. The exact location of the release source is unknown. According to records, the contaminated soil was excavated and disposed at the RWMC. Clean fill was used as backfill.

2. In October 1974, contamination was encountered under Olive Avenue during excavation for installation of lines. This contamination apparently was the result of waste that flowed out of an orifice corroded by nitric acid. The waste was probably from liquids being transferred from Tank WC-119 (sump tank at the WCF) and Tank WC-102 (PEW evaporator).

3. In November 1974, 2,840 L (750 gal) of solution containing an estimated 4 Ci of total activity leaked into Valve Pit MAH-OGF-P-04.

Two quantitative sampling events were undertaken at this site before the Track 2 investigation. In 1974, three samples were collected from the excavation under Olive Avenue and analyzed for radionuclides. The depths from which the samples were collected cannot be established from available reports. In 1991, samples were collected from four boreholes (Golder Associates 1992). The boreholes were drilled to a maximum depth of 1.8 m (6 ft). The samples were analyzed for VOCs, metals, and radionuclides. The VOCs were not measured above detection levels.

The Track 2 investigation involved installing seven "observation wells" to measure subsurface radiation levels and the drilling and sampling of two boreholes. Samples from the boreholes were analyzed for selected metals, nitrate and nitrite, fluoride, pH, and radionuclides. Summary sampling results statistics for data from CPP-36 is provided in Table 5-5. Based on the result of investigations conducted at Site CPP-36, the zone of contamination is assumed to extend from the ground surface to the soil/basalt interface at about 12.8 m (42 ft). This depth is based on high activity levels measured in the deepest samples collected from borings CPP-36-1 and CPP-36-2. Results from the "observation wells" show elevated radiation levels to at least 7.6 m (25 ft) below ground surface (bgs).

The area of CPP-36 is shown in Figure 1-5. The initial area was expanded because "observation wells" located at the boundaries of the area indicate radiation levels above background. In addition, the CPP-36 area has been extended to the southeast to incorporate Site CPP-91. Investigative results indicate contamination at CPP-91 to be indistinguishable from CPP-36. The revised area of Site CPP-36 is about 748 m^2 (8,052 ft^2).

Table 5-4. Summary sampling results statistics for soil contaminants at Site CPP-35.[a]

Contaminants	Soil Concentration (mg/kg [nonradionuclide] or pCi/g [radionuclide]) Minimum	Maximum	Arithmetic Mean	Standard Deviation	RME[b]	Number of Samples	Number of Detects	Frequency of Detection	INEEL Background[c] (mg/kg or pCi/g)	Number of Samples Greater than Background
Mercury	5E-02 B	7.20E+00	1.66E+00	2.49E+00	6.64E+00	14	12	86%	5E-02	11
Cadmium	1.40E+00	1.40E+00	1.40E+00	NA	NA	14	1	7%	2.20E+00	0
Am-241	1.38E-02	1.21E+00	5.17E-01	6.01E-01	1.72E+00	3	3	100%	1.10E-02	3
Cs-137	2.14E-01	8.64E+03	6.63E+02	2.14E+03	4.94E+03	14	14	100%	8.20E-01	9
Eu-154	3.18E-01	11.80E+00	3.37E+00	4.81E+00	1.30E+01	5	14	36%	NA	NA
Pu-238	7.93E-01	1.32E+01	5.44E+00	6.77E+00	1.90E+01	3	3	100%	4.90E-03	3
Pu-239/240	5.24E-02	7.25E-01	3.21E-01	NA	NA	3	3	100%	1E-01	2
Sr-90	7.52E+00	3.24E+03	5.77E+02	1.10E+03	2.78E+03	8	8	100%	4.90E-01	8
U-234	9.59E-01 J	1.02E+00 J	9.82E-01	3.32E-02	1.05E+00	3	3	100%	1.44E+00	0
U-235	5.20E-02	7.20E-02	6.03E-02	1.03E-02	8.09E-02	3	3	100%	NA	NA
U-238	1.01E+00	1.14E+00	1.07E+00	6.51E-02	1.20E+00	3	3	100%	1.40E+00	0
Gross Alpha	3.65E+00	2.02E+02	2.76E+01	5.21E+01	1.32E+02	14	14	100%	NA	NA
Gross Beta	2.04E+01	1.21E+04	1.14E+03	3.19E+03	7.52E+03	14	14	100%	NA	NA

a. NOTE:

- Duplicate sample results were not included in the statistical analysis.
- Analytical results used in this table are from samples colleced from two borings installed during the OU 3-08 Track II investigation (WINCO 1993c).
- Samples were also analyzed for fluoride, pH, nitrate, nitrite, and K-40. These constituents are not shown in this table because they are not present at hazardous concentrations.
- Samples rejected because of an unacceptable quality control parameter are not included in this table.

b. The RME concentration is the 95% upper value based on the empirical rule (95%of the measurements lie within two standard deviations of their mean).

c. The INEEL background concentrations represent the 95% upper confidence limit (Rood et al. 1995).

B = The analyte reported value is <RDL, but >IDL.

J = The analyte was identified in the sample but the numerical result may not be accurate.

NA = Not Applicable.

RME = Reasonable Maximum Exposure.

Table 5-5. Summary sampling results statistics for soil contaminants at Site CPP-36.[a]

	Soil Concentration (mg/kg [nonradionuclide] or pCi/g [radionuclide])									
Contaminants	Minimum	Maximum	Arithmetic Mean	Standard Deviation	RME[b]	Number of Samples	Number of Detects	Frequency of Detection	INEEL Background[c] (mg/kg or pCi/g)	Number of Samples Greater than Background
As	3.20E+00	4.10E+00	3.69E+00	2.59E-01	4.21E+00	8	8	100%	5.80E+00	0
Ba	6.76E+01	8.92E+01	7.69E+01	7.43E+00	9.18E+01	8	8	100%	3E+02	0
Cd	8.10E-01B	8.40E-01 B	8.25E-01	2.12E-02	8.67E-01	19	2	11%	2.20E+00	0
Cr	9.60E+00	1.49E+01	1.21E+01	1.76E+00	1.56E+01	8	8	100%	3.30E+01	0
Hg	1.20E-01	1.66E+01	1.43E+00	3.78E+00	8.99E+00	19	19	100%	5E-02	19
Pb	7.20E+00	3.22E+02 J	4.74E+01	1.11E+02	2.69E+02	8	8	100%	1.70E+01	1
Am-241	1.03E+00	7.63E+02	2.29E+02	3.63E+02	9.55E+02	13	4	31%	1.10E-02	4
Cs-137	2.04E+01	4.08E+05	2.93E+04	9.71E+04	2.24E+05	20	20	100%	8.20E-01	20
Eu-154	8.75E-02	4.74E+03	5.91E+02	1.50E+03	3.59E+03	11	10	91%	NA	NA
I-129	1.23E+00	2.43E+02	6.33E+01	1.20E+02	3.03E+02	9	4	44%	NA	NA
Np-237	4.00E-02	1.90E+00	8.90E-01	6.99E-01	2.29E+00	9	5	56%	NA	NA
Pu-238	1.70E-01	8.18E+03	1.82E+03	3.58E+03	8.98E+03	13	5	38%	4.90E-03	5
Pu-239/240	7.00E-02	3.24E+02	7.41E+01	1.41E+02	3.56E+02	13	5	38%	1E-01	4
Sr-90	2.90E-01	5.13E+04	2.81E+03	1.14E+04	2.56E+04	20	20	100%	4.90E-01	19
U-234	1.00E-01	2.81E+00	6.54E-01	7.95E-01	2.24E+00	13	13	100%	1.44E+00	2
U-235	4.44E-02	9.95E-02	7.19E-02	2.26E-02	1.17E-01	13	5	38%	NA	NA
U-238	1.20E-01	1.84E+00	6.48E-01	5.94E-01	1.84E+00	13	13	100%	1.40E+00	1
Gross Alpha	5.46E+00 J	2.75E+04 J	3.73E+03	8.83E+03	2.14E+04	11	11	100%	NA	NA
Gross Beta	7.48E+01	2.51E+05	4.50E+04	9.85E+04	2.42E+05	11	11	100%	NA	NA

Table 5-5. (continued).

	Soil Concentration (mg/kg [nonradionuclide] or pCi/g [radionuclide])									
Contaminants	Minimum	Maximum	Arithmetic Mean	Standard Deviation	RME[b]	Number of Samples	Number of Detects	Frequency of Detection	INEEL Background[c] (mg/kg or pCi/g)	Number of Samples Greater than Background

a. NOTE:

- Duplicate sample results were not included in the statistical analysis.
- Analytical results are from samples collected from four borings installed during the 1991 assessment (Golder Associates 1991) and from two additional borings installed during the OU 3-08 Track II investigation (WINCO 1993c).
- Sampling results from an investigation in 1974 are not included in this table because the location of one of the samples and depths of all of the samples could not be established.
- The samples from the 1991 investigation were analyzed for VOC's, Metals and Radiological Constituents. No VOC's were measured above detection limits and only those metals and radiological constituents that were identified with concentrations greater than detection limits are shown in the table.
- The OU3-08 Track II Investigation samples were also analyzed for fluoride, pH, nitrate, nitrite and K-40. These constituents are not shown in the table because they are not present at hazardous concentrations.
- Samples rejected because of an unacceptable quality control parameter are not included in the table.

b. The RME concentration is the 95% upper value based on the empirical rule (95%of the measurements lie within two standard deviations of their mean).

c. The INEEL background concentrations represent the 95% upper confidence limit (Rood et al. 1995).

B = The analyte reported value is <RDL, but >IDL.

J = The analyte was identified in the sample but the numerical result may not be accurate.

NA = Not Applicable.

RME = Reasonable Maximum Exposure.